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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/636,484	08/10/2000	Walter David Braddock IV	OSEM-DB3	6691

31518 7590 05/28/2004

NEIFELD IP LAW, PC
2001 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 22202

EXAMINER	
KANG, DONGHEE	
ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 05/28/2004

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 20

Application Number: 09/636,484
Filing Date: August 10, 2000
Appellant(s): BRADDOCK, WALTER DAVID

Walter Braddock
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed October 28, 2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

This appeal involves claims 1-26,and 36-55.

Claims 1-26, 37, 39-52, and 53-55 are allowed. Claims 36 & 38 stand rejected.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claims 36 & 38 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

5945718	Passlack et al.	08-1999
6121153	Kikkawa	09-2000

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims **36** is rejected under 35 U.S.C. 103(a) as being unpatentable over Passlack et al. (US 5,945,718) in view of Kikkawa (US 6,121,153).

Passlack et al. teach an enhancement mode metal-oxide compound semiconductor field transistor comprising (Fig.1):

a compound semiconductor wafer structure (12) having an upper surface' a gate insulator structure (14) positioned on upper surface of said gate insulator structure; a gate electrode (17) positioned on upper surface of said gate insulator structure layer; source (21) and drain (22) ion implants self-aligned to the gate electrode; and source

and drain ohmic contacts (19 & 20) positioned on ion implanted source and drain areas, wherein said compound semiconductor wafer structure comprises an InGaAs (24) layers; and a GaAs substrate (11) on which resides said compound semiconductor wafer structure. See also Col.2, line 65 – Col.4, line 4.

Passlack et al. do not teach an InP substrate. However, Kikkawa teaches that one may use InP for the substrate in place of GaAs (Col.16, lines 5-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute GaAs substrate of Passlack with InP substrate as taught by Kikkawa, since GaAs and InP are art recognized substrate for growing InGaAs compound crystal for semiconductor devices.

The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) (Claims to a printing ink comprising a solvent having the vapor pressure characteristics of butyl carbitol so that the ink would not dry at room temperature but would dry quickly upon heating were held invalid over a reference teaching a printing ink made with a different solvent that was nonvolatile at room temperature but highly volatile when heated in view of an article which taught the desired boiling point and vapor pressure characteristics of a solvent for printing inks and a catalog teaching the boiling point and vapor pressure characteristics of butyl carbitol. "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle." 325 U.S. at 335, 65 USPQ at 301.). See MPEP 2144.07.

Therefore, it would have been obvious to one of ordinary skill in the art substitute InP for GaAs.

3. Claim **38** is rejected under 35 U.S.C. 103(a) as being unpatentable over Passlack.

Passlack teaches an enhancement mode metal-oxide compound semiconductor field effect transistor comprising (Fig.1):

a compound semiconductor wafer structure (12) having an upper surface; a gate insulator structure (14) positioned on said upper surface; a gate electrode (17) positioned on upper surface of said gate insulator structure layer; source (21) and drain (22) ion implants (19 & 20) positioned on ion implanted source and drain areas, wherein the compound semiconductor wafer structure comprises a wider band gap spacer layer (23) and a narrower band gap channel layer (InGaAs, 24). See also Col.2, line 65 – Col.4, line 4.

Passlack in Fig.1 does not show that transistor is integrated together with similar and complementary transistor devices to form complementary metal-oxide compound semiconductor integrated circuit. However, Passlack noted that complementary GaAs devices exhibit optimum speed/power performance and efficiency at a low supply voltage of 1 V and below (Col.1, lines 18-24). This advantageous of complementary metal oxide semiconductor devices are well known in the art.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate transistor together with similar and complementary

transistor devices to form complementary metal-oxide compound semiconductor integrated circuit because of the well known advantages of CMOS configurations.

(11) Response to Argument

Appellant argues that Passlack does not teach a gate insulator structure because it is known that Ga_2O_3 is an n type semiconductor.

This argument is not persuasive. In fact, Passlack clearly teaches that Ga_2O_3 functions as a gate oxide layer (Col.2, lines 45-47). The term "gate oxide layer" would meet the claimed term "gate insulator" because the terms, gate oxide layer and gate insulator, are often used interchangeably in the art.

Moreover, also contemplated in the practice of the present invention (see specification page 7, paragraph 2).

In response to appellant's argument that the references fail to show certain features of claimed invention, it is noted that the features upon which appellant relies (i.e., gate insulator structure comprising at least two layers) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Appellant argues that there is no motivation to modify Passlack in view of Kikkawa by substituting Passlack's substrate with Kikkawa's substrate.

Passlack in fig.1 teaches a field effect transistor comprising:

a GaAs substrate (11); a GaAs buffer layer (25) formed on the substrate; and a compound semiconductor structure (InGaAs, 24) formed on the buffer layer. Passlack does not teach the substrate including an InP based material.

Kikkwa teaches in fig.9 a field effect transistor comprising:

a GaAs substrate (51); a GaAs buffer layer (52) formed on the substrate; and an InGaAs compound semiconductor structure (24) formed on the buffer layer. Kikkwa noted that one may use InP for the substrate in place of GaAs (Col.16, lines 5-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute GaAs substrate of Passlack with InP substrate as taught by Kikkawa, since GaAs and InP both work well as a substrate material for the InGaAs compound layer without any defect.

Applicant also noted that one of ordinary skill in the art would have recognized that GaAs and InP would work equally well as a substrate material for various high speed devices, such as MISFET, HEMT or HBT (see also specification page 4, third paragraph).

See MPEP 2144.07. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945).

Appellant argues, repeated, that AlGaAs and InGaP can not be grown epitaxially on InP. This argument is not persuasive.

The claimed compound semiconductor wafer **comprises** an AlGaAs, InGaAs, InP or InGaP. Therefore, the claims are not limited to AlGaAs and InGaAs. Passlack and Kikkwa both teach epitaxially forming the *InGaAs* compound layer on the GaAs substrate and Kikkwa noted that the GaAs substrate can be substituted by the InP substrate. Thus, the teaching of the prior art is commensurate in scope with the breadth of the present.

Moreover, the present claimed structure also has an epitaxially growing AlGaAs or InGaP layer on InP substrate (see claim 36).

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

dhk
May 13, 2004

Conferees
Olik Chaundhuri

Eddie Lee

Donghee Kang

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

NEIFELD IP LAW, PC
CRYSTAL PLAZA 1, SUITE 1001
2001 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 22202